VPN IMPLEMENTATION

A COURSE PROJECT REPORT

By

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SRM INSTITUTE OF SCIENCE AND TECHNOLOGY

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BONAFIDE CERTIFICATE

Certified that this mini project report "VPN IMPLEMENTATION " is the bona fide work of:

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ABSTRACT

A Virtual Private Network (VPN) has to be Implemented for an ensemble. A network for the same was designed using Cisco Packet Tracer version 8.0.0. The requirements were emulated and tested for connectivity.

A Virtual Private Network (VPN) is a network that is used to create a private scope of computer communications or to provide a secure extension of a private network over an insecure network such as the Internet.

IP Sec or Secure Socket Layer can be used to build a VPN (SSL). These are two fundamentally distinct approaches to VPN development.

In our work, we concentrated on SSL-based VPNs, sometimes known as SSL VPNs. We have used Cisco Packet Tracer to accomplish this purpose.

Pings were used to check the connectivity and the reachability of the systems from the network.

ACKNOWLEDGEMENT

We express our heartfelt thanks to our honorable **Vice Chancellor Dr. C. MUTHAMIZHCHELVAN**, for being the beacon in all our endeavors.

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We extend my gratitude to our **HoD**
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TABLE OF CONTENTS

1. INTRODUCTION

1.1 Description

A virtual private network has to be designed for a system ensemble.

- What is a VPN?

A virtual private network (VPN) extends a private network across a public network and enables users to send and receive data across shared or public networks as if their computing devices were directly connected to the private network.

- Benefits of a VPN:

The benefits of a VPN include increases in functionality, security, and management of the private network.

- Characteristics and Features of a VPN:
  - VPN provides access to resources that are inaccessible on the public network and is typically used for remote workers. Encryption is common, although not an inherent part of a VPN connection.
  - A VPN is created by establishing a virtual point-to-point connection through the use of dedicated circuits or with tunneling protocols over existing networks.
  - A VPN available from the public Internet can provide some of the benefits of a wide area network (WAN). From a user perspective, the resources available within the private network can be accessed remotely.

We need to configure a network design keeping the following requirements in mind.

1.1 Requirement

From the given scenario, we draw the following requirements:

Hardware Required:

3x Router

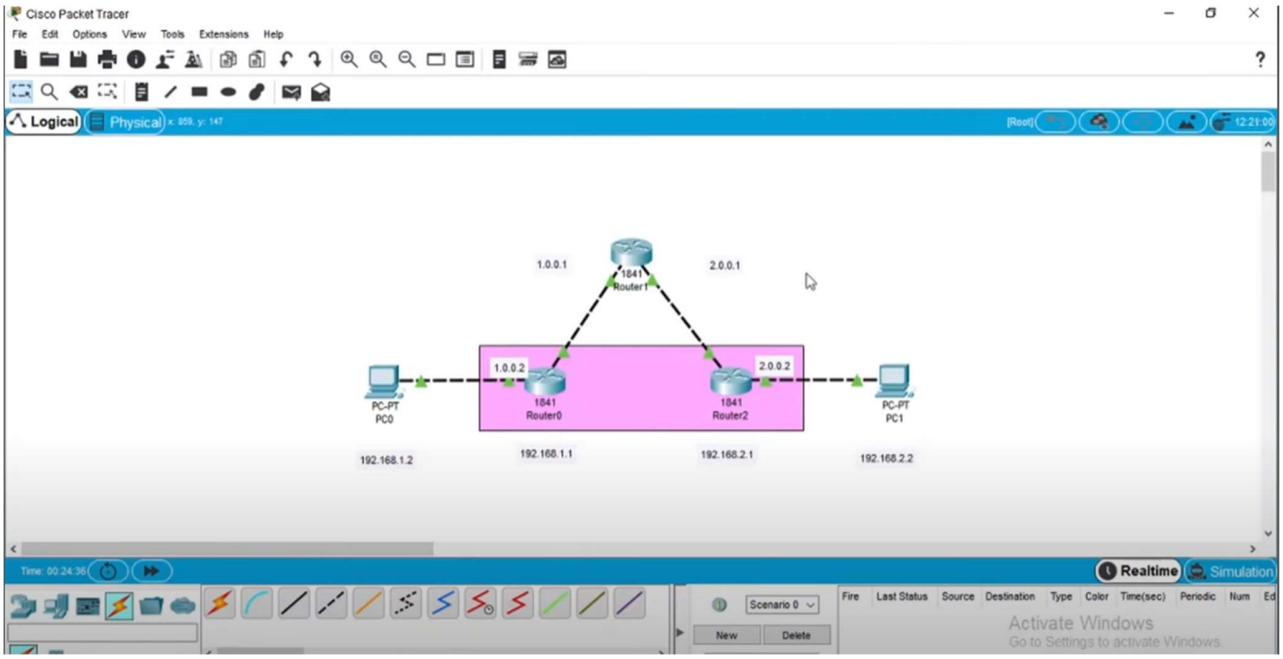
2x PC

Cross-over copper cable

4. ARCHITECTURE AND DESIGN

4.1 Network Architecture

The network architecture is as follows:



It has 2 pcs connected over 3 routers. 1 extra router is used to make the connection private.

5. IMPLEMENTATION

5.1 Address Table

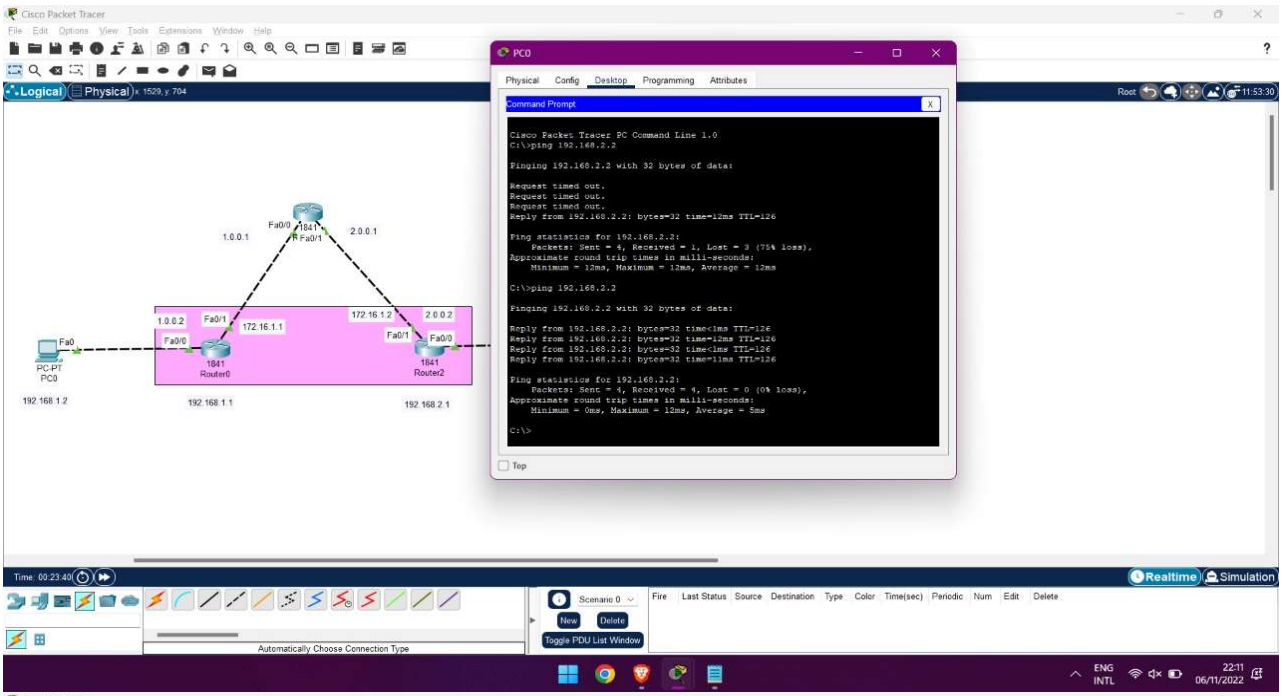
The address table is as follows:

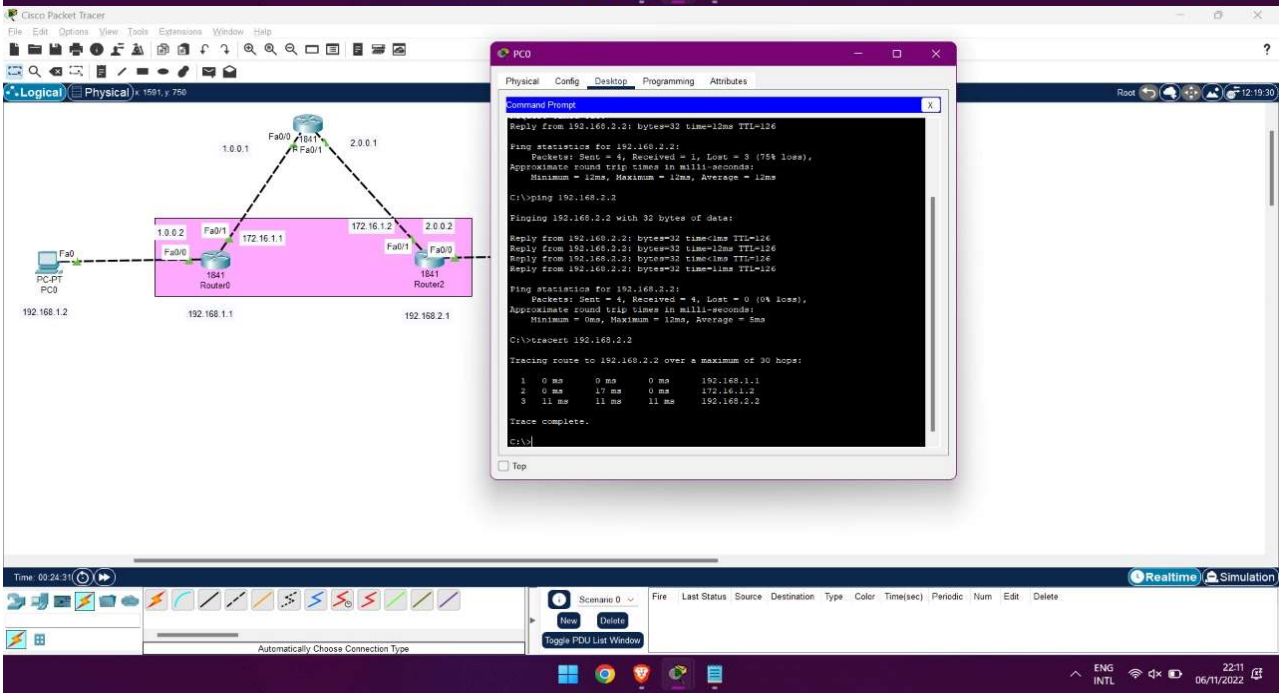
Device	Interface	Address
PC0	Fa0	192.168.1.2
Router0	Fa0/0	1.0.0.2
	Fa0/1	172.16.1.1
Router1	Fa0/0	1.0.0.1
	Fa0/1	2.0.0.1
Router 2	Fa0/0	2.0.0.2
	Fa0/1	172.16.1.2
PC1	Fa0/0	192.168.2.2

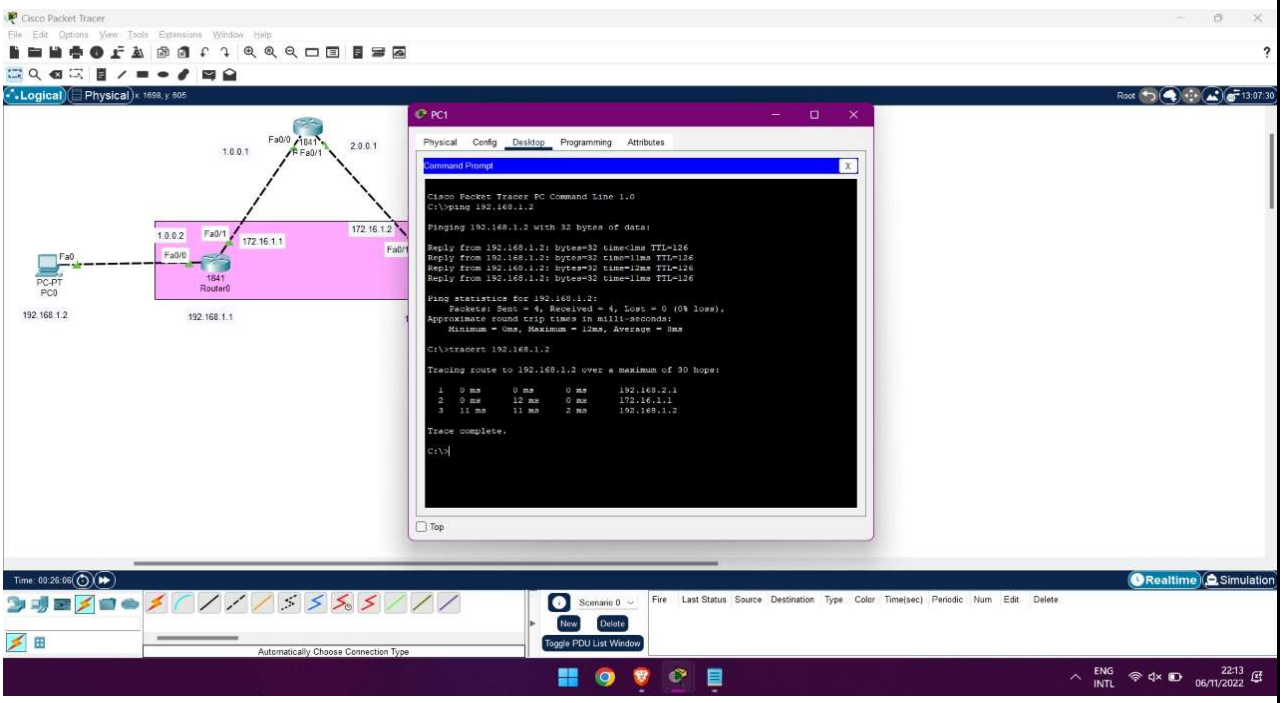
Static Routing is used on all the routers to interconnect the networks.

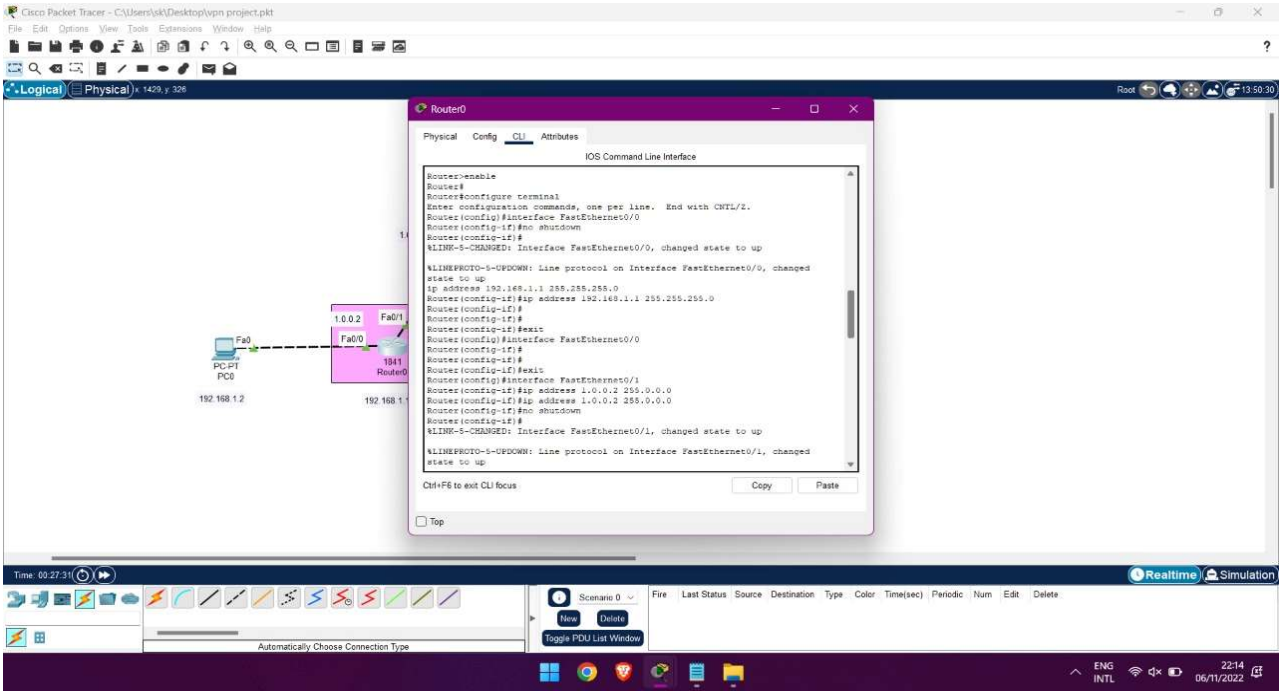
6. RESULTS AND IMPLEMENTATION

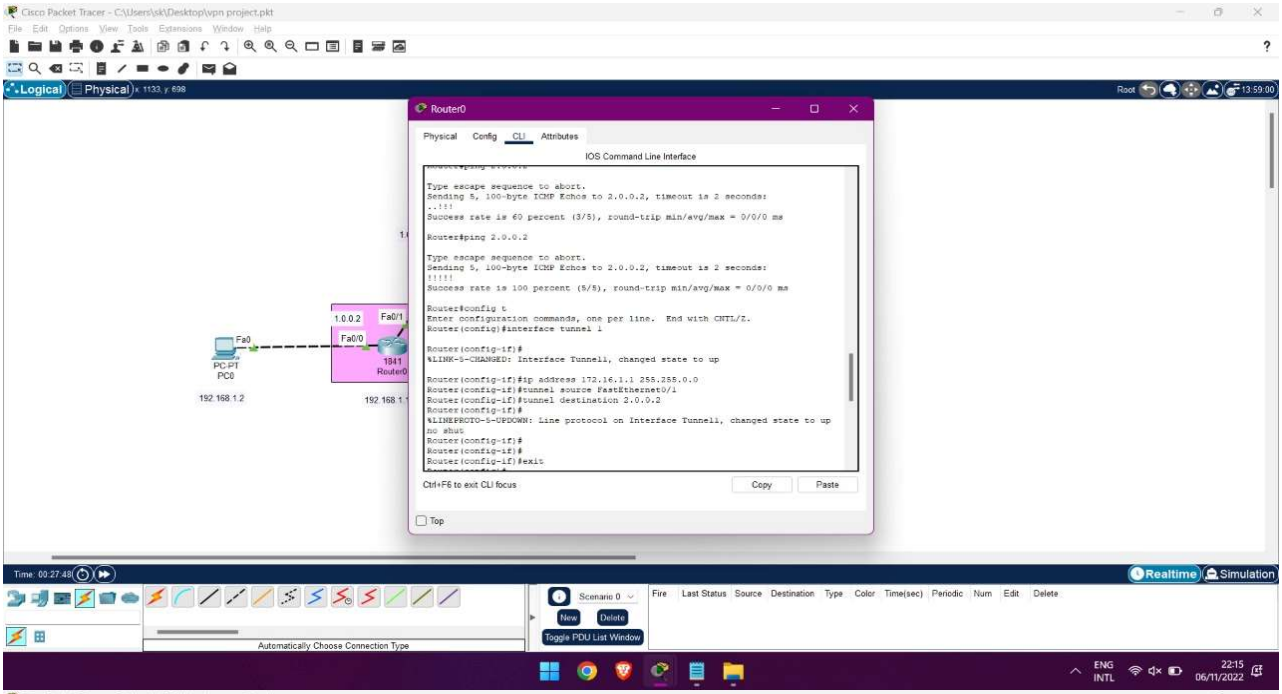
6.1 Implementation and Connection Check

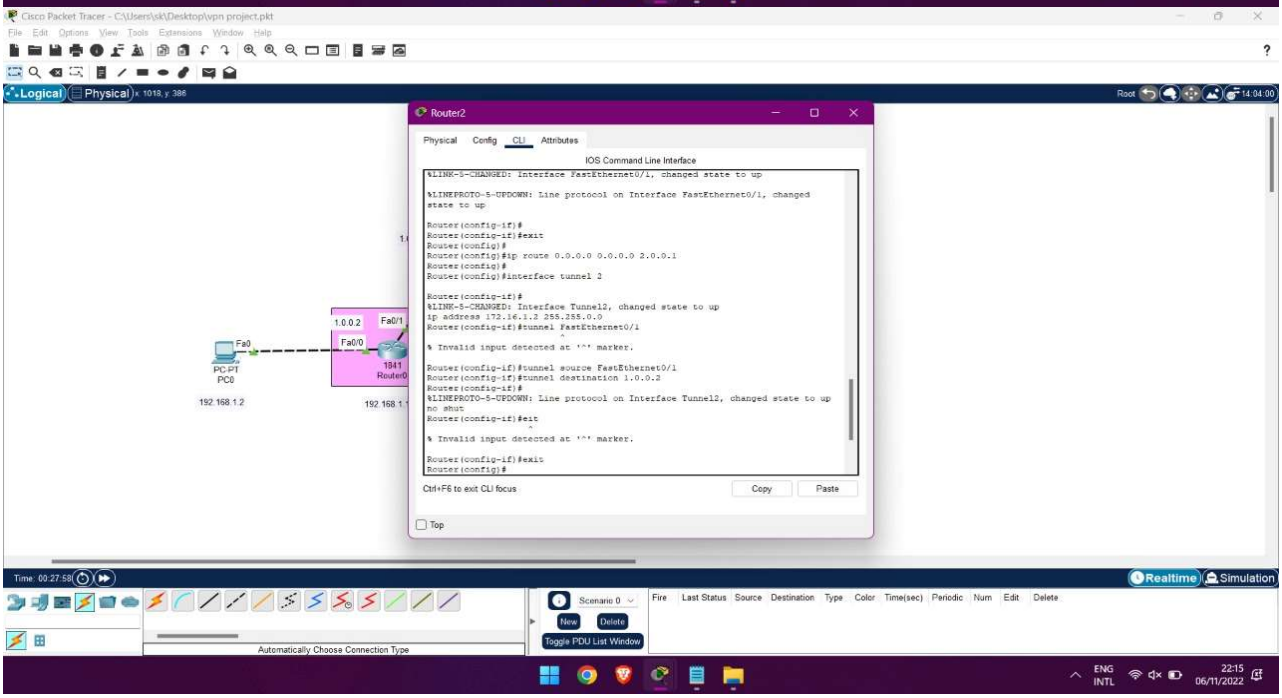


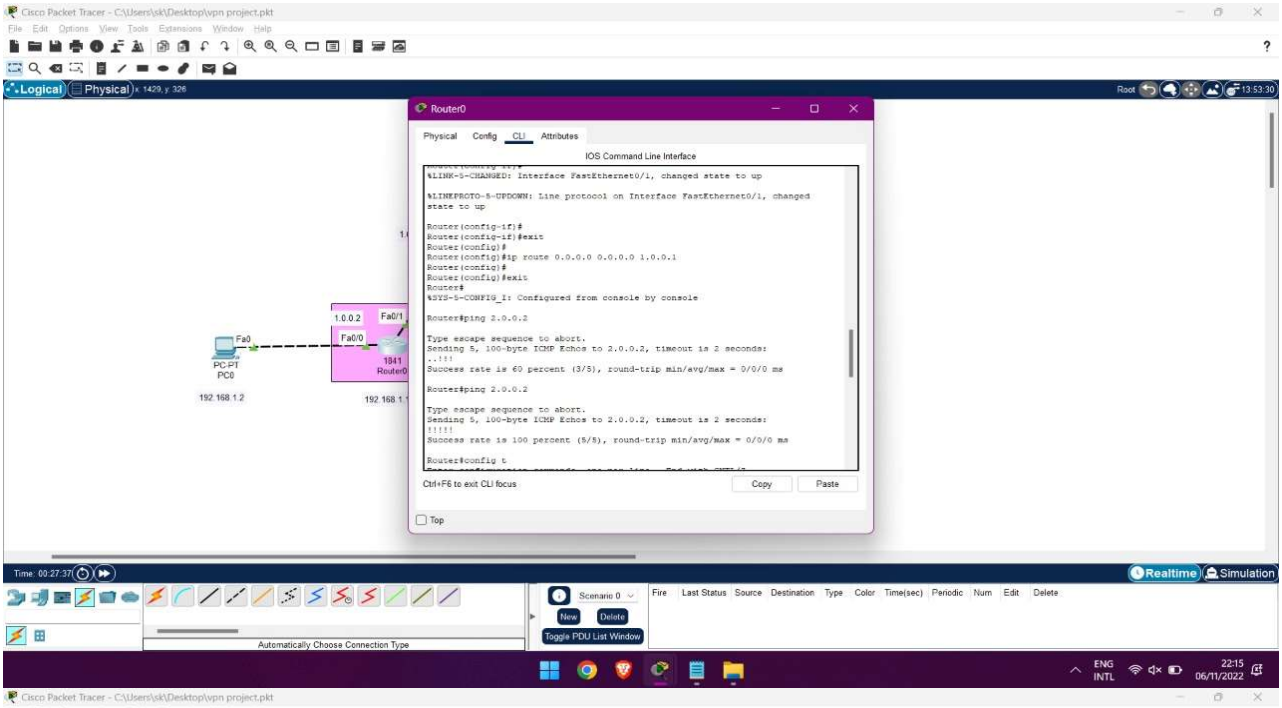


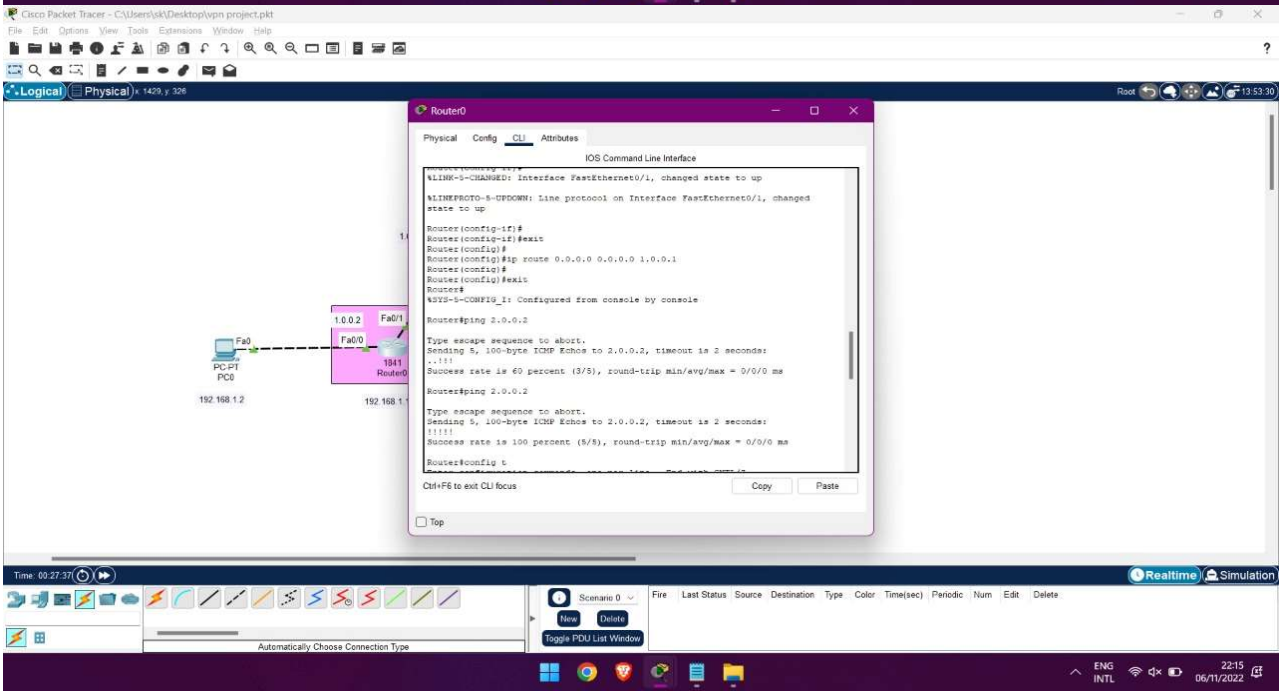

Cisco Packet Tracer
PC1
Physical Config Desktop Programming Attributes
Command Prompt
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.1.2
Pinging 192.168.1.2 with 32 bytes of data:
Reply from 192.168.1.2: bytes=32 time<1ms TTL=126
Reply from 192.168.1.2: bytes=32 time=11ms TTL=126
Reply from 192.168.1.2: bytes=32 time=12ms TTL=126
Reply from 192.168.1.2: bytes=32 time=11ms TTL=126
Ping statistics for 192.168.1.2:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 12ms, Average = 8ms
C:\>tracert 192.168.1.2
Tracing route to 192.168.1.2 over a maximum of 30 hops:
1 0 ms 0 ms 0 ms 192.168.2.1
2 0 ms 12 ms 0 ms 172.16.1.1
3 11 ms 11 ms 2 ms 192.168.1.2
Trace complete.
C:\>
Top
1.0.0.1
2.0.0.1
1.0.0.2
172.16.1.1
172.16.1.2
192.168.1.2
192.168.1.1
Router0
PC-PT PC0
Realtime
Simulation
Automatically Choose Connection Type
Toggle PDU List Window


Router0
Physical Config CLI Attributes
IOS Command Line Interface
Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
ip address 192.168.1.1 255.255.255.0
Router(config-if)#ip address 192.168.1.1 255.255.255.0
Router(config-if)#
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/0
Router(config-if)#
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/1
Router(config-if)#ip address 1.0.0.2 255.0.0.0
Router(config-if)#ip address 1.0.0.2 255.0.0.0
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
Ctrl+F6 to exit CLI focus
Copy
Paste
Top
1.0.0.2
192.168.1.2
PC-PT PC0
Realtime
Simulation
Automatically Choose Connection Type
Toggle PDU List Window


Cisco Packet Tracer - C:\Users\sk\Desktop\vpn project.pkt
Router0
Physical Config CLI Attributes
IOS Command Line Interface
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2.0.0.2, timeout is 2 seconds:
..!!!
Success rate is 60 percent (3/5), round-trip min/avg/max = 0/0/0 ms
Router#ping 2.0.0.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2.0.0.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface tunnel 1
Router(config-if)#
%LINK-5-CHANGED: Interface Tunnel1, changed state to up
Router(config-if)#ip address 172.16.1.1 255.255.0.0
Router(config-if)#tunnel source FastEthernet0/1
Router(config-if)#tunnel destination 2.0.0.2
Router(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Tunnel1, changed state to up
no shut
Router(config-if)#
Router(config-if)#
Router(config-if)#exit
Ctrl+F6 to exit CLI focus
Copy
Paste
Top
1.0.0.2
Fa0/1
Fa0/0
Fa0
PC-PT
PC0
1841
Router0
192.168.1.2
192.168.1.1
Logical
Physical
Root
Time: 00:27:48
Realtime
Simulation
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Time(sec)
Periodic
Num
Edit
Delete
Automatically Choose Connection Type
ENG
INTL
22:15
06/11/2022


Cisco Packet Tracer - C:\Users\sk\Desktop\vpn project.pkt
Router2
Physical Config CLI Attributes
IOS Command Line Interface
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed
state to up
Router(config-if)#
Router(config-if)#exit
Router(config)#
Router(config)#ip route 0.0.0.0 0.0.0.0 2.0.0.1
Router(config)#
Router(config)#interface tunnel 2
Router(config-if)#
%LINK-5-CHANGED: Interface Tunnel2, changed state to up
ip address 172.16.1.2 255.255.0.0
Router(config-if)#tunnel FastEthernet0/1
^
% Invalid input detected at '^' marker.
Router(config-if)#tunnel source FastEthernet0/1
Router(config-if)#tunnel destination 1.0.0.2
Router(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Tunnel2, changed state to up
no shut
Router(config-if)#eit
^
% Invalid input detected at '^' marker.
Router(config-if)#exit
Router(config)#
Ctrl+F6 to exit CLI focus
Copy
Paste
Top
1.0.0.2
Fa0/1
Fa0/0
Fa0
PC-PT
PC0
1841
Router0
192.168.1.2
192.168.1.1
Logical
Physical
Root
Time: 00:27:58
Realtime
Simulation
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Time(sec)
Periodic
Num
Edit
Delete
Automatically Choose Connection Type
ENG
INTL
22:15
06/11/2022


Cisco Packet Tracer - C:\Users\sk\Desktop\vpn project.pkt
Logical
Physical
Router0
Physical
Config
CLI
Attributes
IOS Command Line Interface
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
Router(config-if)#
Router(config-if)#exit
Router(config)#
Router(config)#ip route 0.0.0.0 0.0.0.0 1.0.0.1
Router(config)#
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console
Router#ping 2.0.0.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2.0.0.2, timeout is 2 seconds:
..!!!
Success rate is 60 percent (3/5), round-trip min/avg/max = 0/0/0 ms
Router#ping 2.0.0.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2.0.0.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms
Router#config t
Ctrl+F6 to exit CLI focus
Copy
Paste
Top
1.0.0.2
Fa0/1
Fa0/0
1841
Router0
Fa0
PC-PT
PC0
192.168.1.2
Time: 00:27:37
Realtime
Simulation
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Time(sec)
Periodic
Num
Edit
Delete
Automatically Choose Connection Type
ENG
INTL
22:15
06/11/2022


Cisco Packet Tracer - C:\Users\sk\Desktop\vpn project.pkt
Logical
Physical
Router0
Physical
Config
CLI
Attributes
IOS Command Line Interface
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
Router(config-if)#
Router(config-if)#exit
Router(config)#
Router(config)#ip route 0.0.0.0 0.0.0.0 1.0.0.1
Router(config)#
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console
Router#ping 2.0.0.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2.0.0.2, timeout is 2 seconds:
..!!!
Success rate is 60 percent (3/5), round-trip min/avg/max = 0/0/0 ms
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!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms
Router#config t
Ctrl+F6 to exit CLI focus
Copy
Paste
Top
1.0.0.2
Fa0/1
Fa0/0
1841
Router0
Fa0
PC-PT
PC0
192.168.1.2
Time: 00:27:37
Realtime
Simulation
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Time(sec)
Periodic
Num
Edit
Delete
Automatically Choose Connection Type
ENG
INTL
22:15
06/11/2022

7. CONCLUSION AND FUTURE ENHANCEMENT

VPN is an emerging technology that has come a long way. From an insecure breakoff of public Telephone networks to a powerful business aid that uses the internet as its gateway. VPN technology is still developing, and this is a great advantage to businesses, which need to have technology that is able to scale and grow along with them. With VPN businesses now have alternative benefits to offer to their employees, employees can work from home, take care of children while still doing productive, and have access to work-related information at any time. VPN will also help to make the possibility of a business expanding its services over long distances and globally, more of a reality.

Utilizing VPN results in a significant increase in network load and time delay. This is, however, a small price to pay for the security and privacy offered by a virtual 27 private networks. VPN is the most effective and versatile form of secure communication across long distances. More bandwidth is required to handle the additional network load. A VPN may require a computer hardware upgrade or even additional hardware. If network resources are not developed and expanded to meet the new VPN needs; companies may experience slower response times in e-mail, file delivery, and database inquiries. Model research showed that using a VPN to conduct database transactions adds an additional 446% delay to the query. Significant delay is also added to e-mail and FTP transactions. Leased lines and frame relay networks were the early expensive solution for private networks. Their higher expenses and greater hardware requirements lead to the spread of VPN technology.

The development of PPTP and L2FP protocols led to the integration of VPN technology. The need for increased security led to the integration of IPSec technology into the existing VPN framework. This also changed the focus of VPN technology from layer 2 to layer 3. Today users can remotely access resources through a secure, cheap and convenient virtual private network.

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- https://www.youtube.com/watch?v=jFH6kj9-s0w